The MAC Flyer

MARCH 1982

Safety Awards . . . page 4

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Safety and Efficiency in MAC Air Operations.

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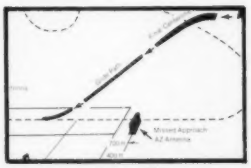

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A Short Suspense

Last November you had forever (well, 5 months anyway) to create your literary masterpiece for the 1982 MAC Flying Safety Writing Contest. Yet here it is March already and the contest ends at the last stroke of midnight on the last day of this month.

With the contest deadline clearly in sight, it's time to throw your creative capacity into high gear, put on your standard MAC dancin' shoes and tap out one each adventure-packed flying safety sortie.

It's a procrastinator's dream of finally "doing the deed" after months of mulling it over and saying to yourself, I really ought to enter that contest this year.

So begin your saga of fact, fiction, or poetry today. You may have the flying safety epic of the decade tucked away in your cranium just screaming to get out and into print. Readers all over the globe are anxiously awaiting the publication of your literary gem.

We will publish the names and units of all 12 1982 winners in the July issue of *TMF* along with the first - place - winning entry.

To enter just follow the simple rules listed below. If you do, you automatically earn a C.R. Terror T-shirt (woven of real cloth) as well as a year's subscription to *TMF*.

First, second, and third-place-winners receive handsome desk sets. Honorable mention winners get engraved wall plaques. Besides the obvious benefits accruing to the winners (kudos from commanders and warm fuzzies from friends), you will be helping to increase safety awareness among your fellow crewmembers, maintenance workers, weather forecasters, et cetera.

Your entry should be postmarked by 31 March 1982. Include a brief autobiography, address, phone number and T-shirt size on the cover sheet to your article. Enter today or forever hold your "piece."

The Rules

The 1982 MAC Flying Safety Writing Contest is conducted according to MACR 900-3 and the following rules. All entries must be original, unpublished, and postmarked no later than 31 March 1982. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages); poetry should be about 75 to 100 lines. Entries must contain an aviation safety message. Manuscripts must be double-space typed and submitted in two copies. Identify entries by title only, and attach a cover sheet showing the author's name, address, phone number and unit. Also, the cover sheet should contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free C.R. Terror T-shirt (so indicate your size) and a one-year subscription to *The MAC Flyer*. However, contest prizes (desk sets and plaques) may only be awarded to military and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a Special Category. All winning stories will be published in *The MAC Flyer*. Entries should be addressed to:

Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB IL 62225

1981 MAC Safety

The MAC Trophy for Flying Safety

Presented to the MAC air force or service with the most effective flying safety program as determined by flight mishap rate, severity, mishap causes, and mission.

22nd Air Force

MAC Flight Safety Achievement Award

Presented to wings or equivalent units that are accident-free and have effective flight safety programs.

39 ARRW, Eglin AFB

60 MAW & 349 MAW (Assoc), Travis AFB

62 MAW & 446 MAW (Assoc), McChord AFB

63 MAW & 445 MAW (Assoc), Norton AFB

89 MAW, Andrews AFB

317 TAW, Pope AFB

374 TAW, Clark AB

375 AAW & 932 AAG (Assoc), Scott AFB

436 MAW & 512 MAW (Assoc), Dover AFB

437 MAW & 315 MAW (Assoc), Charleston AFB

443 MAW, Altus AFB

616 MAG, Elmendorf AFB

MAC Support Safety Achievement Award

Presented to airlift support units which have an exceptional quality of services and successful mishap prevention programs.

Det 3, 322 ALD, Hellenikon AB

611 MASS, Osan AB

619 MASS, Hickam AFB

625 MASS, Torrejon AB

627 MASS, RAF Mildenhall

Special Achievement Safety Award

For superior safety achievement in support of MAC airlift operations.

1 MAPS, Dyess AFB

3 MAPS, Pope AFB

5 MAPS, RAF Mildenhall

Award Winners

MAC Distinguished Flying Unit Safety Award

Presented to the best unit from among those receiving the MAC Flight Safety Achievement Award.

89 MAW, Andrews AFB

MAC Safety Officer of the Year Awards

Primary Duty

Major Joseph C. Reichal, Jr.
834 ALD, Hickam AFB

Additional Duty

Captain Steven C. Mason
Det 3, 322 ALD, Hellenikon AB

MAC Safety NCO of the Year Awards

Primary Duty

MSgt George T. Bennett
76 ALD, Andrews AFB

Additional Duty

TSgt Daniel Meegan
602 OMS, Travis AFB

FLYERS ANONYMOUS

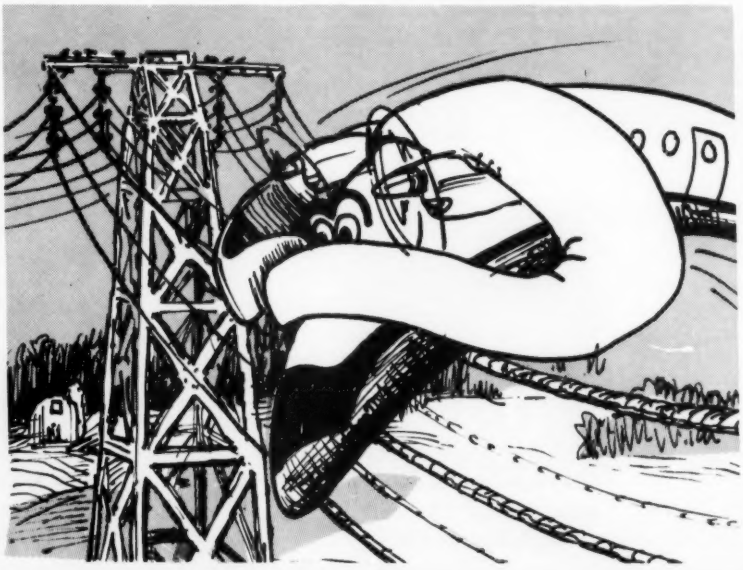
The first incident is taken from NASA's Aviation Safety Reporting System and shows how professional aircrew performance can make the difference when things really come unglued. The second account is adapted from Flight Safety Focus *and is a prime example of the kind of role human factors can play in aviation safety.* —Ed.

Controllability Capers

"Shortly after takeoff we heard a loud bang in the rear of our twin-engine turboprop and immediately encountered longitudinal difficulties. The nose of the aircraft could not be lowered even with full forward yoke. Ceiling was 200 feet at takeoff so the copilot called to find the nearest weather with a higher ceiling. Unfortunately, there was no place nearby that didn't have coastal fog, rain and low ceilings. As we climbed through 4,000 feet, intense vibrations made the aircraft almost uncontrollable and the instrument panel shook which made the instruments extremely difficult to read. About that time, my gyro horizon failed completely and I was reduced to flying the aircraft by reference to the copilot's horizon. I felt we could not stay in the air much longer. I decided to descend and attempt a landing with power and some minimal control rather than possibly have the aircraft get out of control and spin in. I found that by reducing power I could get the nose down and maintain some longitudinal control, so I reduced power and started a descent. About this time the copilot's gyro horizon also failed. We were back in the overcast and I now had only needle, ball and airspeed instruments. Vibration and oscillation were heavy and the aircraft was barely controllable in descent.

"At approximately 1,000 feet above what I thought would be ground level, in an area of rolling hills and heavy woods, I managed to shallow the descent. The first visual contact I had with the ground was a tree passing on my left and I saw a glimpse of a field. We now had a ceiling of about 200 feet and less than 1-mile visibility. I decided to try for the field with a 270° turn to the left, but lost sight of it. Vibration was so heavy that radio contact was lost. Intercom was also lost because the on/off switch vibrated off, but the copilot noticed that and we regained communication. We declared an emergency and started descent.

"I struggled to hold only a 20° bank in the turns under the overcast, and controlled any excessive yawing by power application and some flaps. Flaps pitched the nose up, but once stability was established with power I could maintain altitude and level flight. Completing what I thought was a 270° turn I



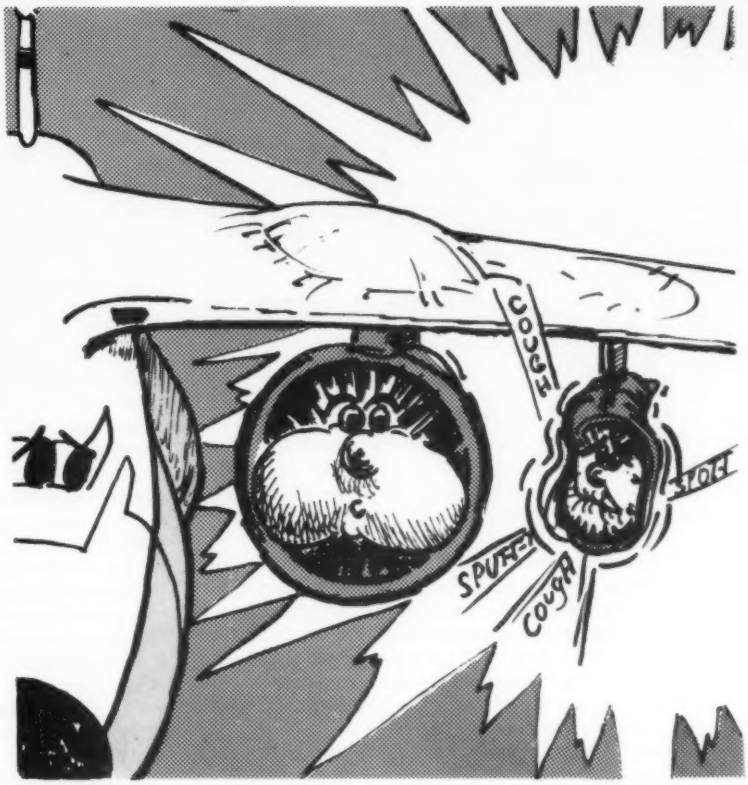
spotted the field I was searching for but saw power lines at the approach end. I was determined to try for it anyway.

"Approaching the wires I called for full flaps and the nose pitched up abruptly. We were barely above the tree tops during the turn and approaching the field. As the nose pitched up, I put the propellers in flat pitch which caused the nose to drop. We cleared the wires and were pitched down heading for the ground. I put full power to the engines; they picked up immediately and pulled the nose up enough that when we hit the ground we were in a level attitude. I threw the props from full power into full reverse and this seemed to keep us on the ground, stopping us abruptly. We later found out the field was only 600 feet long."

The pilot in this incident had related that when confronted with a critical loss of longitudinal control, he remembered someone else's experience with a similar problem. This other pilot had manipulated power and flaps, enabling him to maintain control of his descent and effect a safe landing. We can all benefit from sharing this kind of experience and information with our fellow flyers.

Distraction at FL 390

It was one of those times when the crew would have been especially pleased with having chosen a flying career. At flight level 390 the visibility was virtually endless. As the sun made its way toward the distant horizon, it painted its colorful magic in a multitude of hues on everything it touched. Whatever reveries the crew may have been engaged in were shattered in an instant when the flight engineer discovered that number 1 engine had nearly flamed out from fuel starvation.



The scenario began with the transfer of fuel from the outboard tanks to the inboards because of an imbalance of about 1,000 pounds. The flight engineer's usual practice, as a reminder that a fuel transfer was in progress, was to turn on the blue fuel-level-control-valve indicator lights. Transfer from the number 4 outboard tank was completed first and was terminated. About that time the first officer told the flight engineer that he had tuned to the destination ATIS.

The flight engineer listened to the ATIS and completed his landing data card. As soon as that was accomplished, the captain asked the flight engineer to make an announcement over the PA system concerning a particular landmark. Later, the flight engineer returned his attention to the panel where he noted that number 1 engine fuel pressure was fluctuating and a feed pump light was flashing (almost hidden) behind the crossfeed handle. A quick glance at the number 1 fuel indicator showed 300 pounds. He immediately pulled down all three remaining crossfeed levers so the crossfeed mainifold would feed number 1 engine, and he simultaneously started a reverse transfer from number 2 tank back to number 1.

It seems that the blue fuel-level-control-valve indicator lights, which the flight engineer relied on as his reminder that a transfer was in progress, were obscured when the rays of the beautiful setting sun was painting its colorful magic on that part of the panel.

THE MICROWAVE IN YOUR FUTURE

by Captain Byron L. Howard
Associate Editor

By the late 1980's, ICAO-member countries will begin replacing their old ILS approaches with the new microwave landing system (MLS), a trend already started in this country. By the late 1990's, the more reliable, more versatile MLS will have almost totally replaced the ILS at airports around the world. And by 1983 the Air Force should begin testing a joint tactical microwave landing system (JTMLS) as part of a tri-service team. Along with its aircraft subsystems, the JTMLS will be 100 percent compatible with civilian MLS, as well as providing unique capabilities to U.S. armed forces. This article traces the development of the MLS, describes how it works, and gives a glimpse of how the JTMLS will greatly enhance both flight safety and mission accomplishment.—Ed

Hey pilot, what kind of MLS set-up do you want for this approach?"

"Well, the book calls for a 4.8° minimum glide slope for noise abatement. The approach also ends up with a 40° curved final, rolling out on a ½-mile final. Does the MLS receiver show the airfield data and weather?"

"Affirmative, sir. Runway info is displayed on CRT number 1 and the weather is 'zero-zero.'"

"No sweat. Punch in the numbers on computer 1, tie-in with MLS receivers 1 and 2. Display on both CRT's, couple the autopilot in for the approach—curved MLS and autoland. And tell command post we'll be in the blocks on the hour."

Sounds far-fetched, doesn't it? A curved precision approach ending in a ½-mile final descending on a 4.8° glide slope all the way to an automatic, hands-off landing in "zero-zero" weather. Remarkable as it seems, approaches like this will become commonplace within the next decade. And by the turn of the century (not that far off anymore), they'll be the standard. The key to these "super" approaches—the microwave landing system. The MLS offers a whole new concept in flying instrument approaches. Because of its tremendous versatility, it has the potential to make every other precision and non-precision approach aid as obsolete as the old radio-range is now. But to know where we're going, let's take a look at where we've been.

ILS—40+ and Holding!

It may be hard to believe the ILS is over 40 years old, but it's true. In 1939, the first commercial ILS went into operation at Indianapolis, Indiana. Two years later, the United States adopted the new landing system as the national standard. The war and post-war years delayed full-scale implementation by the International Civil Aviation Organization (ICAO) until 1949. But the ILS possesses some inherent disadvantages which limit its operation.

A precise approach and landing aid, the ILS is limited by the very technology which made it possible. Because the ILS signal pattern is very broad, it is adversely affected by the surrounding terrain, man-made obstructions, hangars, and even aircraft which may block the signal. This means large, flat obstruction-free areas have to be cleared to insure reception—a very expensive undertaking. Although accurate, the system's narrow frequency range (only 40 available frequencies) restricts the number of runways that can be equipped with it at any one airfield, especially when the airport is close to other fields where an ILS is the designated landing aid. Finally, the ILS has never been considered a truly "portable" system, a disadvantage long realized by the military.

"The Road to MLS"

The ICAO began the search for an ILS replacement in the early 1970's. By 1976 proposals had been received from the United Kingdom for its doppler MLS, West Germany for its DME-based landing system, France for its air-ground data-link system, and the U.S. and Australia for the time-reference scanning-beam (TRSB) MLS. The systems advocated by the French and Germans were not sufficiently accurate and versatile for ICAO needs. The next step was to determine which

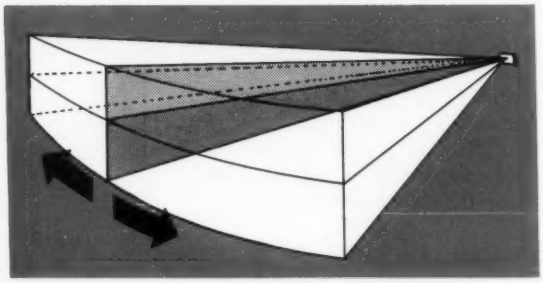


Fig. 1 Scanning Beam for Azimuth/Elevation Data

of the remaining MLS derivatives would be chosen as the international standard.

ICAO international testing continued for the British and the American/Australian systems. Both types of MLS's were installed at 12 international airports around the world—some where even state-of-the-art ILS's were rendered almost unusable due to siting, terrain or man-made obstructions. After exhaustive tests over many months, the ICAO selected the TRSB-type MLS as the new approach and landing guidance system for the world.

How It Works

The MLS is similar to ILS in providing precise approach course and glide slope information via elec-

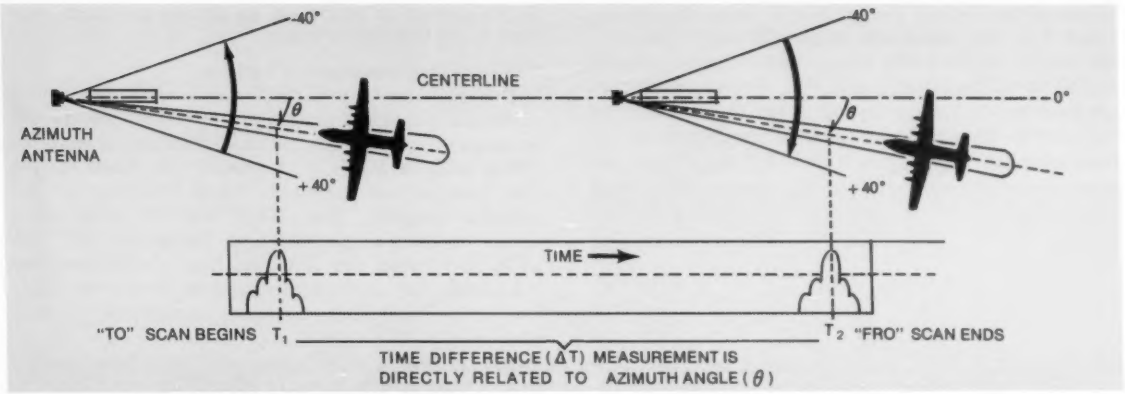


Fig. 2 Principle of MLS Angle Measurement

tronic signals. After that, all similarity ends. The TRSB system uses a C-band (5031 to 5091 MHz) microwave beam sweeping back and forth (or "TO" and "FRO") across the extended runway centerline at a very precise rate. Another beam scans up and down providing glide slope guidance. Coupled with the new precision distance measuring equipment (DME-P) operating in the L-band frequency range (962 to 1,213 MHz), the total MLS provides precise, continuous, three-dimensional position information within a wide coverage volume of the airport area.

An azimuth (course) antenna located on the departure end of the extended runway centerline scans a beam from side to side up to a maximum of 40° either side of centerline. The elevation antenna goes up to ±20°. On each scan, the aircraft receives a "TO" and a "FRO" signal. As the first "TO" beam sweeps past the aircraft, an on-board timer/microprocessor starts timing. The beam, meanwhile, continues to the end of its coverage and then starts back as a "FRO" beam. As it sweeps past the aircraft the second time, this time as a "FRO" beam, the counter clock stops. This elapsed time, measured in microseconds, is compared by the microprocessor unit which knows how long it actually takes the beam to complete a scan at any given point within the coverage area. The comparison of this "reference" to the "real" time measured by the timer, tells the aircraft where it is in relation to runway centerline. The same type signal is also used to determine elevation (glide slope) information simultaneously with course information. Both course and glideslope data are simultaneously compared with the approach course and glide slope angle set into the on-board MLS receiver and computer. The aircraft position, once determined, is then displayed on the cockpit instruments. These displays could be an "old-fashioned" flight director system or newer CRT's (cathode ray tube) just becoming state-of-the-art.

The MLS doesn't just stop there. In addition to the basic course elevation/guidance and DME-P, an additional antenna can be set up to provide flare guidance for automatic landing capability. Another azimuth antenna can be installed to provide "back azimuth" covering a rear area to give the same accurate guidance in case of a missed approach. When the final comparison is made to ILS, there is no comparison.

MLS Spells Versatility and Safety

First the MLS is going to mean safer operations than any other approach aid now available. It will allow all compatibly-equipped aircraft to fly an approach more easily within their limitations. For example, a STOL-type commuter airliner will be able to use shorter, less-used runways (both at major airports, as well as smaller "STOL-ports") in lower weather conditions,

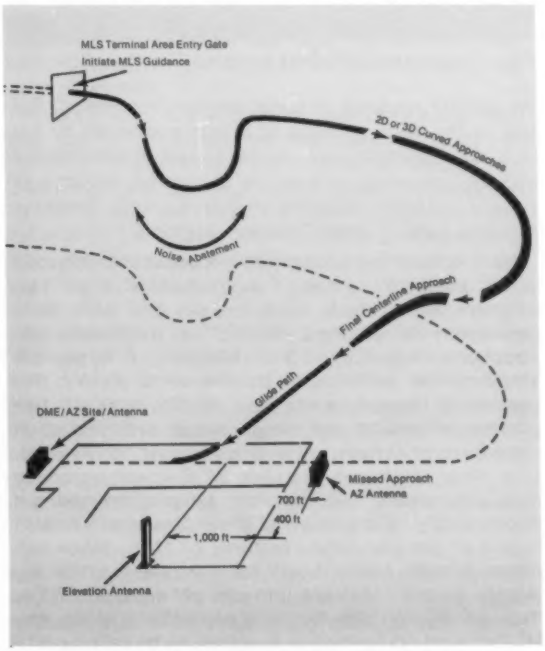


Fig. 3 Potential for Approach Path Flexibility

thus freeing the longer runways for the larger commercial jets. Coupled with the ability to fly precision, curved approach paths, MLS also offers relief for

communities located almost directly under the narrow-beam ILS final approach course at major airports. Located in dense traffic areas, major airports will see additional safety benefits with MLS. Perfect examples are New York's LaGuardia and JFK. The MLS with its 200 channel capability, will provide more coverage for more runways. Again, commuters will be able to use

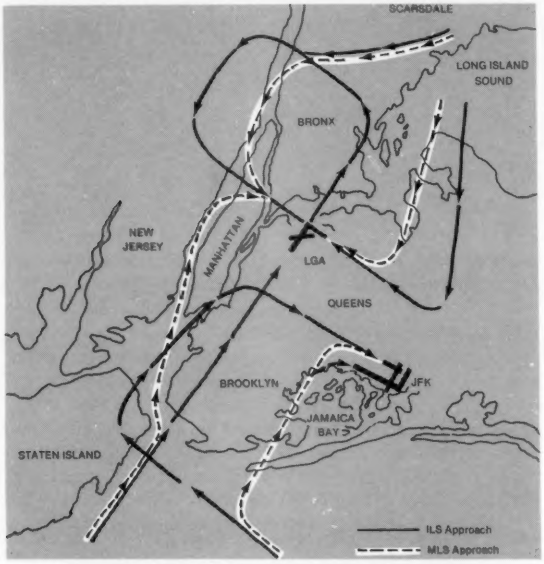


Fig. 4 Example of Efficient Airspace Use Benefits

the smaller runways in lower weather conditions. But due to the larger volume of airspace covered by the MLS, more aircraft can use the airport of their choice without becoming tangled in the traffic patterns of closely located, adjacent runways, thus lowering potential traffic conflict. We're *all* for that!

MLS is also free of many of the drawbacks inherent in ILS, thanks to its design and frequency range. Two of these are multiple false courses and distortions generated by weather, terrain, or man-made obstructions. When an ILS is installed, a large, obstruction-free path has to be cleared to prevent this potentially dangerous situation. MLS is relatively free of these anomalies and can be set up in any location regardless of terrain, other obstructions, or weather. Like other electronic systems, MLS could introduce multipath errors, but they can be programmed out electronically. Elimination of these "multipath errors" is one of the key safety features of MLS. Moreover, future aircraft cockpits will have displays which integrate several functions into one or two main CRT's, thus simplifying the aircrew's crosscheck. Also, the MLS ground equipment is designed to be reliable and easily maintained. Should a single electronic component fail, the whole system will continue to operate. This "fail-soft" feature is based on design and includes back-up components in the system. This will not only improve reliability, but will improve aircrew confidence in the system on which we, as aircrew members, may have to bet our lives one day.

Precision and Versatility in Uniform

The military conducted some of the earliest microwave-beam approach systems research. However, it was a major national effort to develop the TRSB MLS as the U.S./Australian candidate for the new international standard. As an off-shoot of this national program, the JTMLS was conceived as a strictly military development. In September 1976, the DOD designated the Army as lead service program manager for navigation/control systems—PM-NAVCON— the DOD point of contact for all matters pertaining to the JTMLS. A tri-service working-group, including the Marine Corps, was then organized to conduct the armed services' testing for the JTMLS. A shared responsibility, the Army will furnish helicopters, the Navy will furnish a fighter and the Air Force will furnish a transport-type aircraft for the tests. Throughout the development of the JTMLS, the DOD will maintain close liaison with DOT, FAA, and NASA to insure the military JTMLS will meet overall international standards in providing the maximum in *civil/military interoperability.*

What is the JTMLS? Simply, it is a lightweight, man-portable, air transportable landing system based on current MLS technology. It will provide all-weather precision approach guidance to drop zones, landing zones, helipads, and carriers for V C/S/TOL and rotary-winged aircraft. The airborne subsystem includes the necessary electronics to drive normal CDI's, flight directors, data displays, and provides range, range rate, and height above touchdown. In addition, there are panels and controls for pilot selection of glideslope, approach course, course width and operating channel. The system parameters are illustrated in Fig. 5.

Real World Scenario

To better understand how potentially important this new approach aid is, let's see how JTMLS could be used in a real world airlift operation. While enroute to a forward operating base (FOB), the aircrew learns the weather has deteriorated to near "zero-zero." Instead of diverting, which would seriously delay employment of

Precision measurement of:
- Range (±20 feet)
- Range rate (±1.9 knots)
- Azimuth over ±40° sector (±13 feet)
- Elevation -1° to+20° (± 2 feet)
- Height above landing area
- Vertical velocity

Cockpit selectable azimuth and elevation

Fig. 5 System Parameters for JTMLS

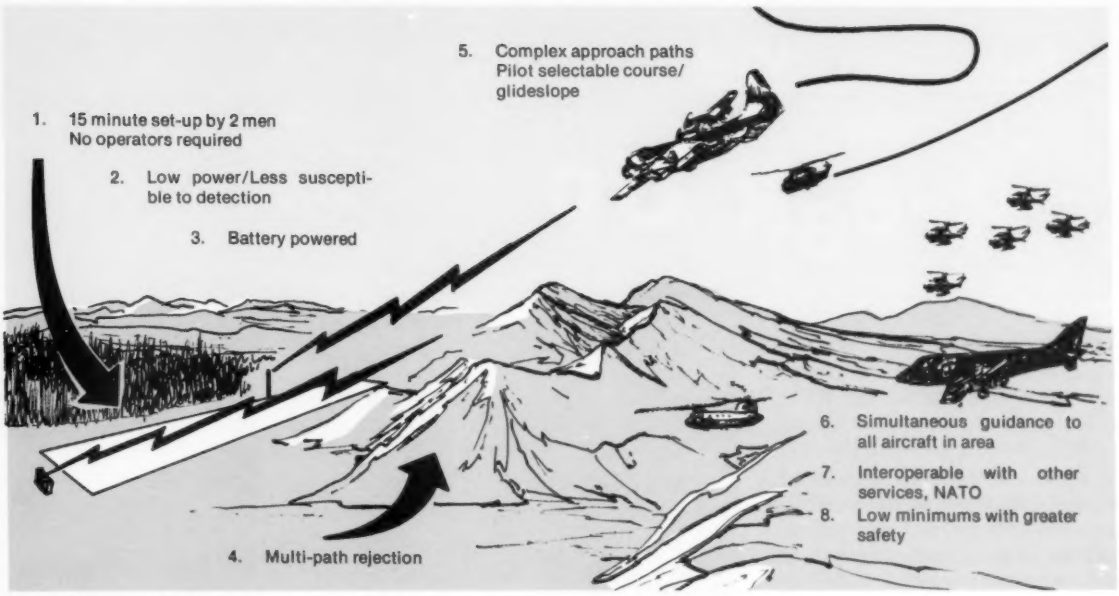

1. 15 minute set-up by 2 men
No operators required
2. Low power/Less susceptible to detection
3. Battery powered
4. Multi-path rejection
5. Complex approach paths
Pilot selectable course/
glideslope
6. Simultaneous guidance to all aircraft in area
7. Interoperable with other services, NATO
8. Low minimums with greater safety

Fig. 6 JTMLS Advantages

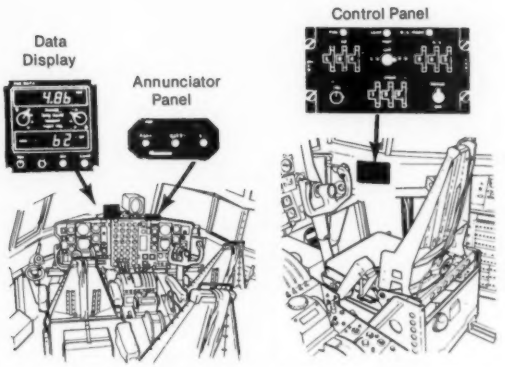


Fig. 7 Airborne System

badly needed troops and equipment, the crew presses on, comforted by the fact that both the FOB and the aircraft are equipped with the JTMLS.

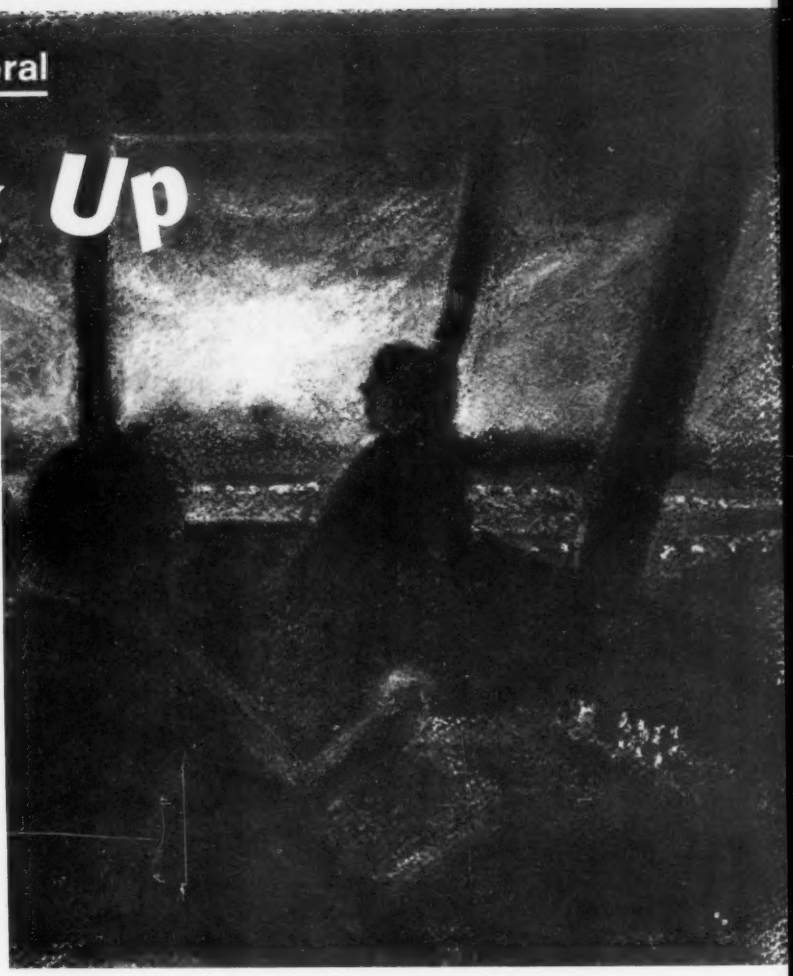
After safely landing at the deployment FOB, the aircraft is quickly refueled and readied for a pathfinder CCT employment mission. Their mission is to set up a drop zone which will be upgraded to an austere LZ later. Arrayed with the latest in DZ acquisition aids, their primary equipment consists of the JTMLS. After dropping into the "boonies," the CCT locates the chosen piece of real estate and quickly gets to work setting up the DZ. Time is of the essence and within 15 minutes, the DZ is established and the JTMLS is set up—and not a moment too soon. Right on the hack, heavy equipment followed by paratroopers come floating out of the heavy overcast. The aircrew never saw the drop zone and the CCT never saw the formation. Still, over 95 percent of the equipment and jumpers are right on the PI. Their mission: take the roughed-out DZ and turn it into an LZ in minimum time.

Within hours, the engineers have completed their task and a 4,000-foot landing zone is ready for operation. And although the weather is overcast, the visibility limited, operations start almost immediately. The CCT, you see, took that one JTMLS unit and relocated it for landing zone operations. After several days, the once rough landing zone has now been upgraded to the job of refueling Army helicopters. Still, the weather has not broken and remains near minimums. Now, LAPES birds begin the job of moving the massive fuel bladders into the LZ, guided by the same JTMLS first used just days before. In minimum time, the "gas station" is ready to begin receiving customers. The first to arrive are Marine and RAF "Harrier" VSTOL tactical attack aircraft, aided in finding the austere base by their on-board MLS receivers. After weeks of poor ceilings and visibilities, the weather clears enough to allow "normal" operations. From the beginning, the contingency operation has been an overwhelming success. One senior ranking officer summed up the reason for the success: "Without that JTMLS operating continuously during the first critical days—no, *hours*—things might have turned out quite differently. The JTMLS gave us that one critical tactical advantage when we needed it most."

And you thought microwaves were just for ovens.

Mishap with a Moral

Break Up



It was 0430 when the transient civilian Lockheed L-188C Electra crew called Hill AFB ground control, requested an IFR clearance to Nellis AFB, and advised ground control of engine start. Local weather at Hill was estimated 6,000 feet overcast with 15 miles visibility. At 0445 the tower controller cleared the flight for takeoff, instructing the Electra to "climb and maintain 11,000 feet." After takeoff the flight was cleared direct to Salt Lake City VOR, then via flight plan route under its own navigation. The 11,000 foot restriction was deleted and the four-engine propjet reported out of 11,000 for FL 200.

Shortly after this call the aircraft momentarily lost all electrical power and permanently lost priority bus A. The commercial crew requested no-gyro vectors to visual flight conditions and clearance for an immediate descent to a lower altitude. The center controller advised the aircraft to maintain 8,000 feet for terrain clearance and then vectored the aircraft north of Salt Lake City Airport. Salt Lake was reporting 10 miles visibility in light rain and a ragged ceiling of 5,500 feet overcast with heavier precipitation to the southeast. The last communication from the flight to the controller was at 0456 when the crew transmitted, "descending. . . ." One second later the cockpit voice recorder tapes recorded the sounds of the aircraft breaking up.

About this time, the Salt Lake City tower controller saw a glow in the sky through the tower windows, heard an explosion, and saw two fireballs descend out of the overcast to the southwest. What the controller had observed was the L-188 disintegrating as it exceeded its structural design loads during a high-speed dive. The final resting place for the ill-fated Electra was, ironically, an abandoned airport some 4 miles south of Salt Lake City IAP. All three crewmembers were killed.

Analysis

The evidence indicates that the Electra developed an electrical system malfunction shortly after the flight departed Hill AFB. The flight crew initially had difficulty with the radar displays on both radar units as well as erroneous VOR indications. NTSB investigators believed these difficulties were the first signs of a progressively decaying voltage condition and an indication of an insidious onset of the major electrical

problems that followed. The erratic behavior of the radar and the VOR during the early phases of flight probably created a state of mind in the flight crew which made it extremely difficult, if not impossible, for them to rely on flight instrument displays after the electrical bus failure occurred.

Initially after the power outage, the crew was uncertain which bus had been lost. Later, the crew realized they still had priority bus B and the essential AC bus. With the essential AC bus operative, electrical power should have been available to the captain's horizon flight indicator, gyrosyn compass indicator, and turn-and-bank indicator; the first officer's turn-and-bank indicator should have been operative. The safety board concluded that the captain's compass indicator was functioning and providing reliable heading information. Also, the close correlation between the postcrash attitude indications (30° nosedown and inverted) on the captain's horizon flight director and the aircraft's actual impact attitude indicate that the horizon flight director was functioning properly at impact.

Following the complete loss of priority electrical bus A, the flight crew was faced with a confusing situation in a darkened cockpit. Moreover, the power loss happened over mountainous terrain in instrument meteorological conditions (IMC). The safety board believed that the captain and the first officer were relying on flashlights for flight panel illumination. The captain's horizon flight director and deviation indicator, although operative, probably would have displayed warnings related to failures of their flight director functions. Similarly, VOR-inoperative flags would have appeared on his deviation indicator and gyrosyn compass indicator. These displays, coupled with the loss of integral lights in these instruments, probably caused him to believe that his flight instruments were also inoperative or at least unreliable.

After the electrical malfunction, the captain took control of the aircraft and quickly became spatially disoriented. Approximately 1 minute before the aircraft disintegrated, instruments recorded the aircraft descending through 9,700 feet at a rate of 12,000 feet-per-minute. At this point the cockpit voice recorder recorded the captain saying, "Okay help me, I'm climbing." This indicated that the captain was totally disoriented and the aircraft was out of control. During its dive the aircraft's structural design loads and its maximum airspeed were exceeded, and the aircraft broke apart inflight about 3,000 feet above the ground.

Probable Cause

The NTSB determined that the probable cause of this accident was a progressive failure in the aircraft's electrical system leading to the disabling or erratic performance of some critical flight instruments and flight instrument lighting while the flight was operating in night IMC. As a result of these conditions, the flight crew could not resolve the instrumentation anomalies to determine proper aircraft attitude reference, and became disoriented and lost control of the aircraft. The crew's efforts to regain control imposed aerodynamic loads which exceeded the design limits of the aircraft and caused it to break up in flight.

NTSB investigators also believed that an independently powered standby attitude indicator would have been an indispensable instrument under these conditions. With the loss or assumed loss of electrically operated flight instruments and cockpit lighting while in IMC conditions, the pilot's main concerns were to keep the aircraft under control and to keep it in level or near-level flight while analyzing the electrical problems. With an attitude indicator that is independently powered, the pilot could be reasonably confident that it is accurate, reliable, and unaffected by electrical problems. Besides being a valuable instrument for maintaining aircraft control, it also could be used to assess the performance of the normal flight instruments. The board believed that had the Electra been equipped with an independently powered standby attitude indicator, this tragic accident probably could have been avoided.

MAC crews who may experience similar electrical problems should not automatically assume, as this crew apparently did, that there is a total loss of electrical power. While following our Dash One emergency procedures we must analyze the extent of any power failure and determine which of our instruments are reliable and which are not. It's a difficult problem to sort out before spatial disorientation takes its toll. But in night IMC, and without an independently powered standby attitude indicator, it may be our only option if we are to avoid a similar fate.

—Adapted from *NTSB-AAR-80-11*

For further discussion of electrical failures see October 1981 TMF's "Blackout in the Cockpit."—Ed

Proximity Switches:
Close Enough for Government Work

Proximity switches are used in several systems aboard various MAC aircraft, usually in the landing gear. Although they occasionally cause trouble, they offer a number of advantages over conventional switching arrangements.

The proximity switch system has three parts: a variable reactance sensor, a target, and a solid-state switch. Bringing the target close to the sensor activates the switch, which can in turn activate a system component or warning light. When the target is removed from the immediate vicinity of the sensor, the process is reversed and the switch is deactivated.

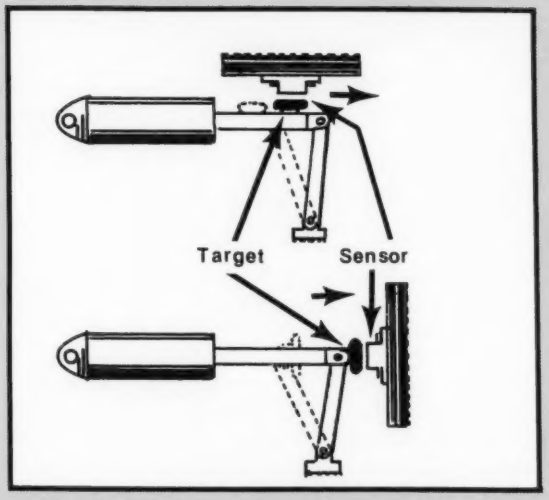
Since the system has no moving parts, it can operate for a virtually unlimited number of switching cycles without wear. Proximity switches also work without disturbing other systems. They are designed to be fail-safe; however, they cannot operate if the sensor or the wiring to the sensor is broken or shorted.

The sensor part of the proximity switch system is a unit containing a magnetic-field-producing coil and core combination imbedded in epoxy or ceramic insulating material. Just which type of potting material is used depends on the temperatures expected at the location where the sensor will be installed. Sensors can be mounted almost anywhere and they will operate in virtually any environment. The electrical connections to the sensors are made of permanently attached teflon-covered wires. Sensors are normally installed at fixed locations, with their targets attached to the moving part whose change in position is to be sensed. When the target moves nearer the sensor, decreasing its angle from the sensor, or moves across the sensor, a signal is sent to the switch.

The switch portion of the system consists of a solid-state circuit mounted on a printed-circuit board that will fit into an economical standard switch case. To provide a protected environment, the switches can be mounted some distance from the sensors.

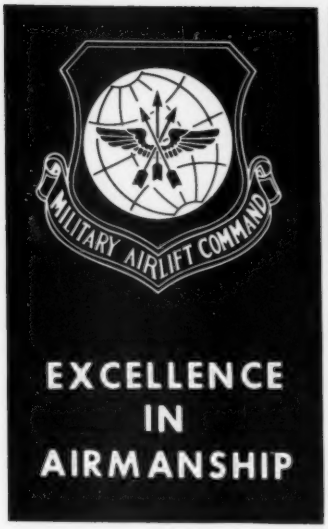
A strong inherent ability of the sensor to recognize only the intended target is a key feature of the system. Targets are made of an easily magnetized material such as 80 percent nickel-iron alloy. Size and shape of individual targets are not critical. Careful selection of sensors insures that the system doesn't react to aluminum or titanium. The system is also insensitive to temperature variations, voltages induced into sensor leads, and other irrelevant influences.

To show how the system works, let's look at how it's used in a typical landing gear position indicating setup. The sensor is attached to the airframe near a landing gear actuator arm, and the target is attached to the arm. When the gear is down, the arm brings the target in proximity with the sensor. Voltage across the sensor coil changes, which activates a transistor switch. The switch turns on the landing-gear down light (or indicator). When the target is moved away from the sensor, the voltage is again changed, the switch deactivated, and the light or indicator turned off.



Proximity switches are ideal for applications requiring freedom from arcing, wear, corrosion, and sensitivity to environmental extremes. Since proximity switches virtually never wear out, they offer error-free indications of systems operation and sequencing. For aircrew members this means that an unsafe indication from a system controlled by proximity-switches is most probably legitimate and not just a "switch malfunction." Because of their dependability and advantages over other types of switching systems, MAC aviators can expect to see more proximity switches used in future aircraft designs and modifications to current airlifters, increasing overall systems safety.

—Adapted from Lockheed's *Galaxy Service Letter*



Left to right: Capt Eldon H. Cook, CP; Major James J. Nicholaus, AC; Capt John R. Matejczyk, IN; TSgt Jerry L. Justice, FE; and SrA Mark S. Lantz, LM. Not pictured: Crew chiefs SrA Darryl Vanlandingham and A1C Willis W. Colpitts.

Major Nicholaus and crew from the 21st TAS, Clark Air Base, Philippines, were flying an exercise mission from Misawa AB, Japan to Osan AB, Korea. Approximately 45 minutes from Osan at cruise altitude, flight engineer TSgt Justice, identified an engine failure of the Herk's number 1 engine. Approximately 1 minute later after engine shutdown procedures were completed for the number 1 engine, number 2 suddenly failed as well. Major Nicholaus, the AC, coordinated the shutdown of number 2 engine with Captain Cook, the copilot, and began a descent. Captain Matejczyk, the navigator, relayed the aircraft position to ATC and ensured terrain clearance during descent.

After scanning number 1 and 2 engines, SrA Lantz, the loadmaster, reported that the number 1 propeller had not feathered, was windmilling, and hydraulic fluid completely covered the number 2 engine. He also reported the utility hydraulic reservoir was completely empty.

The crew stabilized the aircraft at 10,000 feet MSL and 175 knots and elected to continue to Osan due to better weather and crash equipment availability. Manual gear extension procedures were begun 40 miles from Osan because of the depleted utility hydraulic system. SrA Vanlandingham and A1C Colpitts, the crewchiefs, worked in a concerted effort with the flight engineer to successfully lower the left main gear. On top of everything else, the right main gear would not lower due to a malfunction of the emergency manual extension handle. Overhead Osan at 10,000 feet with only the left main gear down and locked, the crew elected to windmill the number 1 propeller in an attempt to get enough hydraulic pressure to lower the rest of the gear. Number 1 prop was windmilled to 50 percent which gave sufficient hydraulic power to lower the right main gear. By using emergency extension procedures with the auxiliary hydraulic pump, the nose gear was then lowered. Major Nicholaus flew a flawless no-flap, two-engine approach into Osan AB and safely landed the crippled Hercules. Postflight inspection revealed several maintenance discrepancies, including numerous cracked turbine inlet case struts, a generator that had broken completely in half, a starter duct broken off, and excessive metal particle accumulation on the power section mag plug.

The outstanding crew coordination, knowledge of aircraft systems and the calm professionalism of Major Nicholaus and crew were directly responsible for the safe recovery of a valuable aircraft and all personnel on board. The teamwork of each aircrew member during this emergency reflects the highest degree of professional airmanship.

DUE TO A LACK OF PHOTO
BETWEEN TEXT AND BACK
DID NOT REPRODUCE WELL

AIRLIFT AN

15 Years for the HH-53

The first flight of the HH-53B heavy-lift helicopter occurred on 15 March 1967. The Aerospace Rescue and Recovery Service had ordered eight of the huge helicopters less than 7 months before from the Sikorsky Aircraft Company. Deliveries to ARRS began in June 1967. Larger and more powerful than the HH-3E "Jolly Green Giant" which was already in service in Southeast Asia, the HH-53B, or "Super Jolly Green" as it was often called, quickly began flying combat rescue also.

The next year, Sikorsky began delivering an improved version, designated the HH-53C. Its T64-GE-7 engines provided considerably more power than those initially installed on the B-models,

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and gave rescue crews greatly improved combat capability. Besides more powerful engines, the C-model also sported two 450-gallon auxiliary fuel tanks. These jettisonable tanks were attached to newly designed mounts. And like the earlier B-model, the HH-53C also had inflight refueling capability and, of course, a rescue hoist used to pull downed aircrew members from the jungle. For recovery or other support missions, the C-model equipped with a 20,000-pound-capacity external cargo hook definitely put a capital "H" in heavy lift.

Flying the HH-53, rescue crews piled up an impressive record of "saves" in Southeast Asia. And in the years since, the "Super Jolly Green" has continued to be the means by which many a critically ill person, injured camper or flood victim has been lifted to safety. *TMF* salutes the HH-53 and the crews who have flown it during the past 15 years so "That Others May Live."

Tom Laughlin

Fascinating reading for aviation buffs.

BOOK REVIEWS

by Major James G. Gibson II
774 TAS, Dyess AFB, Texas

The Airline Builders
by Oliver E. Allen
(Copyright 1981)

Although the United States airline industry eventually grew to dominate commercial flying endeavors worldwide, America got off to a relatively slow start in the formative decade following World War I. Meanwhile many countries in Europe quickly saw the potential inherent in using airplanes as a form of transportation, and began lavishing government subsidies on their fledgling airlines. Some, like France, considered commercial airpower to be an instrument of national honor. With so many countries competing for routes and business, activity was brisk, to say the least. The pioneering spirit of the early commercial airline developers was epitomized by the British, who blazed air trails across deserts and jungles to the Middle East and Africa. Like other colonial powers in Europe, they saw aviation as an expeditious way to "keep in touch" with their holdings and interests in far-flung locations around the globe. Sir Alan Cobham of Imperial Airways, one of England's most ambitious and colorful pioneer pilots, absolutely relished the challenge of opening new routes. In the mid-1920's, he traveled for months at a time in his pontoon-equipped biplane, making surveying trips to such exotic areas as India, South Africa and Australia to introduce air travel.

It took a hardy and adventurous soul to travel by air in the early days. Generally converted from surplus warplanes, the first airlines were noisy, uncomfortable and subject to a multitude of mechanical malfunctions. A few, however, provided surprisingly opulent accommodations. Imperial's Handley-Page HP-42, a massive four-engine biplane, and Germany's DO-X, a giant flying boat with 12 engines, both featured the kind of amenities and services normally only associated with first class ocean liner travel. For example, the cabin of the Handley-Page, which was about as big as a Pullman railroad coach, had wall-to-wall carpets, a stand-up bar, and stewards (no stewardesses then) who served seven-course meals. The monster Dornier contained dining rooms, sleeping quarters, and the 23-foot-long central saloon was carpeted with oriental rugs. Sadly, the DO-X, capable of carrying nearly 270 passengers in style and comfort, was too far ahead of its time. After an extensive publicity cruise around Europe and across the Atlantic to America, its builder deemed the behemoth an unrealistic venture because it received derisive and embarrassing press reports, and the mighty seaplane was relegated to a Berlin museum.

Carrying air mail had been a big incentive to entrepreneurs in Europe, and that lucrative aspect of commercial aviation also provided the appeal

America needed to get started. Helping tremendously to set the stage was the Kelly Act of 1925, which opened air mail feeder routes across the country to private contractors. Once investors and commercial flying service companies started competing for the government's mail carrying business in earnest, the growth of airlines and the aviation industry in general took off like the Gold Rush of 1849. One Pratt and Whitney executive saw a $40 cash investment made in 1923 mushroom within 3 years to a value of more than $3 million, while another lucky aviation tycoon parlayed $253 into $35.6 million! Of course, there were many casualities in the stampede, too. *The Airline Builders* tells some of their curious stories as well. It's all here: how various airlines around the world got started, their battles for routes and favored status with the government, who won and who lost, who the colorful and sometimes ruthless movers and shakers were, and a potpourri of anecdotes describing the sometimes profound, sometimes bizarre events related to commercial aviation from its inception until just prior to World War II. This eighth volume of Time-Life's Epic of Flight series features the well-researched narrative and graphic array of historical photos we have come to expect. It also provides engrossing insights on commercial aviation's flying machines, the people who built and piloted them, and the managers and manipulators who literally developed the worldwide airline industry from the ground up.

Stars in Flight
by Edgar F. Puryear, Jr.
(Copyright 1981)

If you have ever wondered, as I have, where the select few who make it to the very top of the Air Force come from, you will find some of the answers in Edgar Puryear's "study in Air Force character and leadership," as his book is subtitled. Choosing for his subjects the first five Air Force Chiefs of Staff, Puryear examines each man and his career in detail. He uses their own pronoucements, personal recollections and writings, and also blends in information and anecdotes about them from people who knew them and associated with them professionally during their rise to stardom. The result is an extremely interesting and personal analysis of how each chief's background and experience groomed and equipped him for the top slot in the Air Force command hierarchy. You will probably be surprised at the marked differences in personalities and leadership styles exhibited by these generals, the traits and attitudes they had in common, and the career hurdles and setbacks some had to overcome. Above all, you will learn why each was uniquely suited for that top slot.

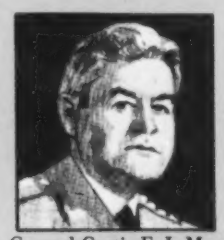
Each had superior insight and foresight and brought forceful influence to bear on the bureaucracy. They helped the Air Force become and remain a strong and effective independent military service. Whether you're looking for role models to pattern your own career after, or just want some enjoyable and informative reading about the leadership, character and personal qualities of some of our top Air Force generals, *Stars in Flight* is well worth your time.

General Carl Spaatz
1947-1948

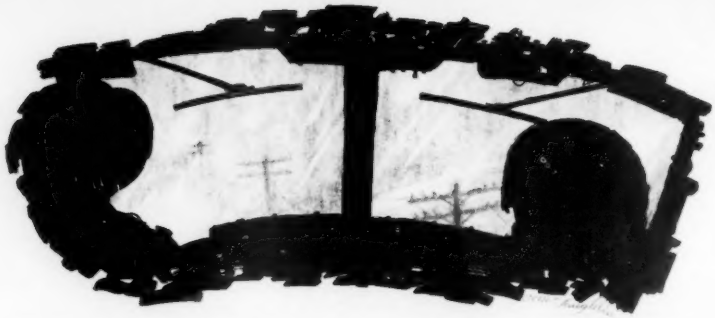
General Hoyt S. Vandenberg
1948-1953

General Nathan F. Twining
1953-1957

General Thomas D. White
1957-1961



General Curtis E. LeMay
1961-1965



A young pilot flies an unforgettable sortie with . . .

The Expert

by Captain Steven H. Demel
HQ MAC Stan/Eval

When I walked into the detachment that morning I could hear the other pilots laughing from behind the ops counter. What now, I thought to myself? I had been in the helicopter detachment unit for over 6 months, but I was still a source of amusement for the other pilots. Maybe it was because I was the only "butter bar" in our unit. Of course any type of amusement is scarce when you're a helicopter pilot on a northern tier missile base.

"Well 'Lootenant'," said an "old" first lieutenant, "have we got a deal for you. You've been selected to ferry a helicopter from Kansas to the bone yard." Something was wrong. I could feel it. Even I knew that cross-country ferry flights were good deals.

"Why are you guys being so nice?" I asked suspiciously.

"We have decided you need the experience," said another pilot. For some reason this statement brought on new rounds of laughter.

"Which one of you is going with me?" I asked. When no one answered, my suspicions grew. Then it hit me like a "norther" blowing down the South Dakota prairie. *I was going to Kansas with our operations officer, Captain Cool.* The good deal suddenly looked like a nightmare.

Captain Charlie Cool! No one should be afraid of a mere captain, right? Well, "no one" had ever met Charlie Cool. Charlie had to be the oldest captain still flying helicopters in the Air Force. His gray hair was crewcut, just like a Marine drill sergeant. In fact he'd been both a Marine *and* an Army warrant officer. Somehow, Charlie managed to stuff his stocky frame inside a flight suit. And Charlie had a mean look about him and an overbearing manner.

Charlie's reputation had indeed preceded him. One well known incident involved an argument between Charlie and a safety investigation board president. Charlie was arguing about the techniques for crash landing a helicopter. (The board was for an accident Charlie had in a new helicopter).

"Well captain," said the Colonel, "are you an expert on helicopter crash landings?"

"I should be," boasted Charlie. "I've crashed five of them."

Somehow, though, Charlie almost always seemed to come out on top—and if he didn't he would not only get even, he'd try to *destroy* you. Many former helicopter pilots in the civilian world today were put there by Charlie Cool. I was merely intimidated by Captain Cool on the ground, but a flight with Charlie was my idea of a reign of terror. (Speaking of terror, many people believed Charlie to be a cousin of "C. R. Terror" himself.) I remember him saying once that all his friends called him "Chuck." But nobody I knew ever called him that.

Charlie and I landed at Wichita in a Podunk Airways DC-3 on a beautiful Wednesday afternoon. We proceeded to McConnell AFB helicopter operations, and discovered two helicopters to be flown to the "bone yard" at Davis-Monthan. Charlie turned a brilliant shade of red when he saw a name on the other crew list. The other pilot was from higher headquarters stan-eval. The AC, Captain J. R. Varroom, was known to be a fast-burner and the word was he had flunked Charlie on an instrument checkride the year before. It seems poor Charlie had actually hovered over the VOR awaiting approach clearance rather than fly a standard holding pattern. Charlie disliked Captain Varroom so much he made a sort of hobby out of hating him. I think the feeling was mutual, but it was hard to tell with Captain Varroom since he always wore a little half-smile, like the proverbial cat that had

Honorable Mention, 1981 MAC Flying Safety Writing Contest

just swallowed the canary.

Varroom had already checked in at the McConnell VOQ and was planning to takeoff at 0900 the next morning. Both aircraft were expected at Davis-Monthan before close of business on Friday. Charlie announced that we would depart at 0800 local, stating that no "skinny little headquarters weenie" would ever be ahead of him at anything. We looked over the ancient Huey we'd be flying and checked the next day's weather. And although the weatherman didn't promise us a rose garden, the forecast wasn't the worst I'd ever seen.

I must admit I enjoyed that evening. Charlie and I went to the officer's club for dinner and, as it turned out, for entertainment too. The club itself didn't offer regular entertainment on Wednesday nights, but Captain Varroom was seated next to us during dinner. Listening to Charlie and Captain Varroom verbally abuse each other was entertainment enough for me. But there was still the next day to go.

The weather forecast had been for high clouds and fairly good visibility. And there may well have been high clouds when I looked outside the next morning, but I couldn't see them due to other clouds hanging down around 300 feet. It was drizzling when Charlie and I walked into base ops at 0630 for our weather briefing. The civilian forecaster called for less than VFR enroute with some light to moderate icing, with the ceiling only intermittently up to 700 feet and visibility of 1 mile. Charlie, obsessed with beating Varroom, pleaded, threatened and *demanded* a better forecast. The forecaster, to his credit, did not budge. I was relieved, for this was not the kind of weather for helicopter operations. But Charlie wasn't finished. At 0700 the civilian was relieved by a sergeant. Charlie walked up to the counter as if he had just come in the door. After Charlie had totally intimidated the young NCO, we walked out with a slightly modified forecast: 700 feet and 1 mile, intermittent 200 feet and ¼ mile in a freezing drizzle. The forecast still contained light to moderate icing conditions enroute, however. At this point I protested. "What about the icing?" I asked.

"Oh weather people always throw that in just to cover themselves. There won't be any icing, not this time of year," smirked Charlie.

"I still don't think it's safe to fly VFR in this kind of weather," I replied.

"Lieutenant, you're not paid to think," he scolded. "Any more comments and I'll leave you here." Maybe if I had been a first lieutenant I would have called his bluff.

Charlie was sure our luck would change. It did! The aircraft started to ice up.

I filed a direct flight route to Davis-Monthan AFB, with minor deviations for refueling stops. But Charlie changed all that. "We're going to RON in El Paso! That weenie, Varroom, will never take off in this stuff. Stick with me kid, and I'll show you some real fun tonight," Charlie laughed.

Airborne by 0745, Charlie gave me the standard orders. "You navigate, I'll fly," he said flatly. We flew below the clouds at about 300 feet above the ground. Otherwise the weather was not bad, with about 1 mile visibility in a light drizzle. Although I was using aeronautical sectional charts to navigate, a standard highway map would have worked better. Charlie was using his version of "IFR" (I Follow Roads). We managed to fly through Oklahoma without getting into the ice-laden clouds. Charlie had intended to refuel in Amarillo. But as we reached 40 miles east of there the weather suddenly began to get worse. He kept descending to stay below the clouds. I pleaded with Charlie to turn around while we still had enough fuel. "This is just an isolated shower," the senior captain replied. "We'll be out of it any minute."

By this time I was frantically trying to track our movement on the map. If you look on a sectional chart of Amarillo, you'll see dozens of towers, some over 1,000 feet high. This is *not* comforting knowledge when you are flying at 50 feet and can only see as far as the second telephone pole up ahead along the road. The poles went left and the road right. Charlie followed the poles. "These poles will take us right to the airport," he confidently explained. "I remember them from the last time I flew through this area." I hoped Charlie was right. At least the road had been on my map—the poles weren't.

Charlie, however, was not right. We followed the poles, a couple of paved roads and finally a dirt road for 30 minutes. We were so low our VOR was useless. I figured we were south and west of Amarillo. Charlie was sure our "luck" would change. It did! The aircraft started to ice up. It became

harder and harder to see as the defrosters were able to clear only a small hole on the windshield.

"Captain, if we don't land now the engine will flame out!" I stated matter-of-factly. But before Charlie could argue, a giant tower appeared in front of us. I hollered, Charlie screamed and slammed the aircraft into a hard right turn, somehow missing the tower and its many guy-wires. Charlie had finally had enough low-level flying so he pulled in all the power he could and we climbed up through the clouds. At 8,000 feet indicated, we broke out on top. Checking our position on the VOR, I informed Charlie we were southwest of Amarillo heading directly towards Cannon AFB, New Mexico. We had barely enough fuel to make Cannon.

"If we don't land now, the engine will flame out!"

Charlie contacted Cannon Approach Control, "Bever 27, 20 miles northeast at 5,000 feet requesting climb to 8,000 and radar vectors for landing at Cannon. Negative transponder."

The controller came back, "Standby Bever 27." Before I could tell Charlie that a high-density jet traffic area was the last place to lie about your altitude, I saw an F-111 coming right at us. I grabbed the controls and made a rapid descent and right turn. Charlie started screaming about a stupid so-and-so fighter jockey. He almost came on the radio to complain, but I reminded him we were supposedly at 5,000 feet.

Well Charlie got us into Cannon. We didn't have a PPR number for landing but, as usual, Charlie bulled and bluffed his way through it all. Then it was on to El Paso and that night, Juarez, Mexico. We went to Charlie's favorite restaurant in Juarez which, strangely enough, happened to be a Chinese place. Charlie always considered himself quite a spiffy dresser. That night he wore his purple Hawaiian shirt, baggy gray trousers and brown hush puppies. After dinner he undoubtedly "knocked 'em dead." As for me, I returned to my room in El Paso.

The next morning I went to the aircraft and waited for Charlie. He drove up in a taxi still dressed in his evening finery. He ordered me to get the thing started and get out of there pronto. I did! Charlie, meanwhile, got in the back and promptly went to sleep. He did pull on his flight suit when we stopped for fuel. But once we were airborne, he went to sleep again.

Around noon I entered the traffic pattern for landing at Davis Monthan AFB, Arizona. The old helicopter had done real well up until then. Unfortunately, the thought of where it was going must have been too much for the old Huey to handle. On down wind the hydraulic pump failed. I probably should've been more nervous, but after my "travels with Charlie," this seemed mundane. I declared an emergency and made an uneventful landing on the runway.

I shut down the engine and watched as the fire trucks circled around me. I waved that everything was okay as a man from a crash truck ran up to the aircraft. "Hey kid, nice landing," he said. "By the way, who's the guy in back with the strange get-up on? Is he alright?" he asked. I looked in the back. Charlie was fast asleep. His inside out flight suit did not completely hide his Hawaiian shirt or hush puppies. "All right? " I asked in a surprised voice. "Are you kidding? That's Captain Charlie Cool—an 'expert' on crash landings."

ABOUT THE AUTHOR

A 1972 graduate of the Air Force Academy, Captain Demel completed undergraduate helicopter training in 1974. From 1974 to 1979, he flew the H-1F with the 37th ARRS at Ellsworth AFB, South Dakota. After a 2-year tour as an instructor and Chief of Squadron Standardization, 1550th FTS, Kirtland AFB, Captain Demel came to Scott where he now works in the Aircrew Evaluation Division, HQ MAC Stan/Eval. A senior pilot with over 2,500 accident-free flying hours, Captain Demel recently completed a master's degree in management and finance.

MAC INDIVIDUAL FLYING-HOUR MILESTONE AWARDS

10,000

Lt Col John A. Raper, 1550 ATTW
Lt Col Gerald P. Violette, 4 MAS
Maj Don F. Graves, 3 MAS
Maj Robert W. Shorr, HQ 14 AF
SMSgt Gene R. Boles, 9 MAS
SMSgt James M. Walganski, 4 MAS

5,000

Col Bruce M. Purvine, 375 AAW
Wg Cmdr David F. L. Edwards, HQ MAC/DOVA
Lt Col William J. Phaneuf Jr, 164 TAS
Maj John J. Farrell, 708 MAS
Maj William D. Greene, 158 TAS
Maj John T. Petts, 1551 FTS
Capt William R. Leeds, 75 MAS
Capt James R. Sweller, 708 MAS
Capt Scott E. Willson III, 708 MAS
CMSgt Charles B. Thomas, 1550 ATTW
MSgt Wayne F. Estey, 18 MAS
MSgt Ronald T. Gignac, 18 MAS
MSgt Edward J. Linneberger, 1551 FTS
MSgt Coster L. Livingston, 158 TAS
MSgt Richard L. Madison, 4 MAS
MSgt Bobby T. Tucker, 20 MAS
MSgt Claude S. Wright, 158 TAS
TSgt Elijah Davis, 774 TAS
TSgt Maurice C. Forsythe, 774 TAS
TSgt Richard D. Lorenz, 1551 FTS

2,500

Col Clarence C. Campbell, 37 ARRS
Capt James C. Jobe, 1551 FTS
Capt Dennis C. Malbon, 1550 ATTW
SMSgt Larry L. Austin, 1550 TCHTS
MSgt Peter J. Thomas, 1551 FTS
TSgt Donald H. Hale, 1551 FTS
TSgt Edward R. Ragsdale, 1551 FTS

(ranks and units are those at time of award).

DEJAVU

Kunsan Air Base, Korea

(elevation: 35 feet)

Located on the west coast of Korea on a tip of land jutting out into the Yellow Sea, Kunsan Air Base is 7 miles southwest of the city of Kunsan. The nearest major airfields are Kwang-Ju, 50 miles southeast, and Osan, 73 miles northeast. The highest terrain within 25 miles is a mountain peak, 2,602-feet MSL, 25 miles southeast.

Kunsan Air Base has one runway, 18/36, which is 9,000-feet long and 150-feet wide. It's a precision runway with high intensity approach lights, a 1,000-foot overrun, jet barrier, VASI's, runway end identifier lights, and high intensity runway lights. The runway also has radar reflectors.

The normal parking location for C-130/C-141 aircraft is just south of the midfield point. Aircrews should use caution for major construction on taxiway 1 (parallel) and taxiway 3 through October 1982. Hardstand/taxiway 5 is 8,100 feet long and 75 feet wide. Taxiway 3 is unusable for all MAC aircraft. Taxiways are not stressed for C-5 operations and pad 50 is the only parking spot available for the C-5.

The parallel taxiway surface may become soft during the summer months (May through September) due to solar heating. There is an unlighted 150 foot hill 1,500 feet southwest of the runway 36 threshold.

Airlifters should consult the 22AF summary of airfield restrictions prior to transiting Kunsan.

On final to runway 18 at 1 mile. Do not mistake the parallel taxiway for the runway.

On short final runway 18. The parking ramps are to the left.

On final to runway 36 0.5 miles. The airfield complex is to the right.

C.R. TERROR

The Ace of Aerospace teams up with Clarence Chandelle for a Stalzburg SNAFU.

C.R. Terror stood with his long suffering sidekick scrutinizing the squadron scheduling board. "Looks like you're going out on a 'fiesta run' down south, Sammy m'lad," C.R. said dolefully, pointing to Sam's name.

"Too bad they busted you back to copilot, Boss," Sammy consoled. "Otherwise you might have gotten that trip."

"There's no justice Sam—and all for such a minor misunderstanding too," whined C.R. "To this day I thought the guy said cleared for takeoff."

Checking off the other crew set-ups for upcoming missions, C.R. finally spotted his moniker down at the very bottom, under "bravo alert." Not recognizing the aircraft commander's name, the Corpulent Copilot asked, "Hey Sam, who's this Lt Col Clarence Chandelle?"

"I'm not sure, but I think he works in some staff job up at wing. Hasn't been here too long, though."

"Aha, might know they'd stick me with one of those wing weenies," C.R. declared. "I bet he's been hiding behind a desk for years until getting called back to the cockpit. Well, maybe we won't get launched during our alert period."

"Maybe you won't," agreed Sam, "but the last five-in-a-row have."

The two erstwhile partners parted and C.R. retired to his luxury apartment and a round of video games on his brand new superdooper computer- controlled toy.

Just as the Dauntless Dolt managed to actually score a point against the "tax-man" game, the phone rang. It was Sergeant Hardnox at squadron ops. "You're going to be launched, Major Terror," he said matter-of-factly. "You'll be deadheading to Windsor Knots, Connecticut to pick-up—" C.R. interrupted him in midsentence.

"Hold on there my fine fellow. You obviously have me confused with the decision maker on this crew. I am now a lowly co-jock, and all I do is read the checklist and work the gear handle—when ordered, that is. Really Sarge, all I need to know is to what part of the globe we are bound. Pays to pack for the local conditions ya know."

"Haven't got the final destination yet, Major. All we know now is that it's somewhere on the European continent. Should know more at show time."

"No problem," C.R. chuckled, "I'll just plan my wardrobe to cover anywhere from Antwerp to Istanbul."

After hanging up, C.R. tossed a few extra cans of "Con-Carnage"-brand chili into his already bulging B-4 bag with a flourish and bounded out the door, whistling "Jimmy-crack-corn and I don't care."

C.R. and company gathered at the squadron only to learn that their AC, Colonel Chandelle, still hadn't been told where they were going. He gave a crew briefing anyway. "Uh, well now crew, we'll be deadheading to Windsor Knots, Connecticut and go into crew rest and then fly the C-5 that's already there to wherever we're going. The load is some big and heavy high priority equipment and it's got to get to wherever it's going pronto." By this time, C.R. was fast asleep in the third row. His snoring was so loud it woke up Sergeant Downs, the loadmaster, in the next seat, who, in retaliation, nudged C.R. into semiconsciousness. "They're still trying to pin down the exact destination," drawled Colonel C. "They did tell me it's somewhere between Luxembourg and Liechtenstein, though." After finishing the more standard items of the briefing, the planeless crew proceeded to base ops to do a little preflight planning.

"How are we supposed to do any planning without knowing where we're going?" lamented Lieutenant Dale Weems, the navigator.

"Not to worry, my young Magellan," C.R. prompted as the two walked into base ops. "You must learn to be flexible in this business. Why I've taken off many times without knowing where I was going, and as you can see, I've always gotten back okay so far."

"Finally got a 'semi-firm' destination for us," Chandelle announced as the rest of the crew

joined him at the command post window. It's a place called Stalzburg and it's between Dierdorf and Olberkfeld. I suppose you've been there, haven't you Major Terror?" asked the AC of MAC's most experienced copilot.

"That's probably about the only place I haven't been, sir," replied C.R. honestly.

"I'll see if they have any DOD approaches listed for that area," offered the nav.

"And I'll see if base ops has any Jeppesen plates," echoed C.R. "Never can be too careful about these places off the beaten path."

"Better hurry, the crew bus is waiting," called Colonel Chandelle as the two disappeared through the doors leading to the flight planning room.

After the short hop to Windsor Knots, the crew proceeded to their Galaxy to check the forms. After deciding all was shipshape, Chandelle ordered transport and they went into crew rest.

C.R. was pleasantly surprised at the way his new AC handled everything. The next morning they were off on time with the high-priority load, bound for Stalzburg International Airport in the heartland of Europe. Although the departure was a little less than smooth, what with C.R. trying to read the checklist and talk on the radios at the same time, the good colonel took up the slack and got them well on their way. During cruise, C.R. divided his time between HF position reports and wolfing down cup after steaming cup of his infamous "Chili-Con-Carnage." "Want to try some, colonel," he offered, as the Jalapeno-green fumes slowly escaped from the hyper-hot concoction. "I've even added some of my own special home-grown peppers."

"No thanks, C.R." replied the courteous commander. "You do like the hot peppers, don't you?"

"Oh, yes sir. It puts excitement into the simplest fare," affirmed C.R. with a gasp as the effect of the gastronomical dynamite reached its peak.

Soon they were coasting into Europe so the crew made ready for descent and C.R. attempted to roll the scroll checklist to the descent check with one hand and pop the last half of a Jalapeno pepper into his mouth, his eyes watering profusely.

"Well, crew," Chandelle began, "according to the weather forecast, they should be landing on runway 18 so I'll brief the ILS found on page 64 of the approach book. Besides, that's the only DOD approach there is to the airport. We'll just ask for radar vectors to the ILS final."

With C.R. still trying to rewind the checklist, the left-seater began the descent as directed. "MAC 007," advised the controller, "you are cleared for ze VOR 1 NDB approach to runway 36. Proceed direct to Stalzburg VOR, descend und maintain 9,000 feet."

"What!" blustered Chandelle. "How could they do this to us? Copilot, did you get those alternate civilian approaches for this airport?"

"Sure did," said the Field-Grade Fumbler confidently, "and here *it* is."

"Only one copy for the whole crew," objected the concerned AC.

"Yes sir, these commercial approach plates are expensive, ya know," replied the Frugal Flyboy.

"Well, pass it around so the nav can take a look at it before we get in too close. He'll need to set up the approach in the INS for a back-up," ordered the left-seater.

Meanwhile, C.R. was still struggling through the descent check, obviously unaccustomed to right-seat duties. "Hey pilot, this scroll must be broken," he said listlessly as they neared the level-off point. With C.R. completely out of the picture, Colonel Chandelle began to handle the radio calls to approach control, tried to figure out which way to turn upon arrival at the VOR and, at the same time attempted to brief the changes to the approach as they occurred.

"MAC 007, you are now cleared direct present position to Handsel intersection for a no-procedure-turn approach from there."

"I know they're trying to help us, but—," the AC was interrupted again.

"MAC 007, squawk 4800, und ident. Now cleared to 6,000 feet, say level passing," asked the controller.

"We're at 8,500," said Chandelle tensely, beads of sweat beginning to form on his furrowed brow.

"Crew briefing," C.R. blurted through the intercom, settling on that checklist item, even though the descent check had never been completed.

"Starting the tear drop," announced the left-seater, squinting at the only available approach plate. "Got to get down," he said, and pulled the throttles to idle.

"Cleared to 3,500," radioed the controller in a thick accent.

"I could never understand these controllers' English," admitted C.R. "Say again please for MAC 007."

With the autopilot still engaged and the throttles at idle, Chandelle punched on altitude hold when they finally reached 3,500 feet. He hoped it would free him to make sure everything else was done, including the copilot duties. As they struggled through the before-landing check, the AC elected to lower the landing gear, but kept the flaps up for local noise abatement procedures. As the harried crew struggled through the landing reports and checklist, nobody noticed the airspeed bleeding off rapidly.

"Crew landing report," C.R. repeated in exasperation for the third time. Just as the AC started a left turn to final, the aircraft shuddered. As the giant airlifter began stalling, the right wing suddenly dropped to near 90° bank and C.R., oblivious to the situation, continued to call for the crew landing report.

"Oh, no!" gasped Chandelle, "I've stalled it out!"

"Yipes," yelped C.R., coming to life at long last and mentally rejoining the crew. But the throttles were still at idle and the flaps were up. Turning out over a nearby lake, the nose pitched down and the shoreline of the lake filled the windscreen of the plunging Galaxy. Instinctively, Chandelle pulled back on the yoke which immediately induced a secondary stall. Then, as if instantly becoming fully aware of the situation, the AC called for the flaps and simultaneously slammed the throttles to the fire wall. The mammoth C-5 finally recovered barely 300 feet above the ground. Chandelle, though visibly shaken, regained enough composure to turn back toward the airfield and configure for landing. It was a surprisingly smooth touchdown and no one talked much as they taxied in—not even C.R.

Finally, after the plane was parked and the big turbofans wound down, C.R. turned to his new AC. "You know, colonel, we almost bought the farm out there, and it just hit me that I wasn't much help to you at all."

"All I can hope for, C.R.," returned the pensive left-seater, "is that *all* of us have learned a whole group of vitally important lessons from this near-disaster."

"Right you are colonel, right you are."

QUICK STOPPERS

Rigged-Wrong Runaway

A brown-and-green flying machine was level at 6,000 feet MSL on an exercise mission when the aircraft suddenly descended 500 feet on its own. The Hercules crew reacted to the excessively nose-down condition and attempted to regain level flight. They were able to correct the situation by placing the emergency trim switch to "emergency."

Some hours later during final descent, nose-down pressure started again at 8,000 feet MSL with unscheduled elevator inputs. This time the emergency trim switch failed to correct the situation. Despite excessive nose-down pressure the Herk pilots were able to land the aircraft safely. Later inspection by maintenance troops found improper adjustment of elevator cables and loose mounting bolts on the elevator boost pack.

RD for Short

During cruise at FL 350 the Sabreliner copilot felt a change in pressure in his ears. Both pilots then noticed the cabin altitude was increasing at 8,000 feet per minute. The crew immediately donned their oxygen masks, declared an emergency, and began a descent as the cabin altitude passed 10,000 feet. They landed uneventfully at a nearby European base. Culprits in this caper were two wires which shorted out the cabin air selector switch, causing the rapid decompression.

Slip Slidin' Away

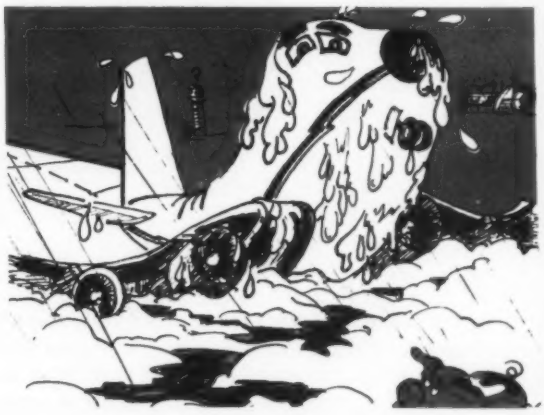
On the initial leg of a scheduled three-leg flight, the Boeing 747's number 3 engine was developing minimum power for takeoff. On the second leg,the engine was still marginal so the captain requested maintenance take a look at it prior to departing for a flight over the North Atlantic.

Some bleed valve work was accomplished and the aircraft was readied for departure. After takeoff (maximum gross weight), the engine slowly spun down and the EGT climbed rapidly. The engine was shut down and the crew started getting ready for a three-engine approach back to the departure runway. The ceiling was 600 to 800 feet with 3-miles visibility in light rain, and the wind was down the wet runway at 6 knots.

Because of the crew's fixation on airspeed control, they were late in configuring the aircraft for the approach. When they went visual at 500 feet AGL, they intentionally ducked under the ragged ceiling to remain VFR and abruptly leveled off because of a GPWS warning for excessive sink rate. Airspeed and rate of descent both went awry and they crossed the threshold high and fast.

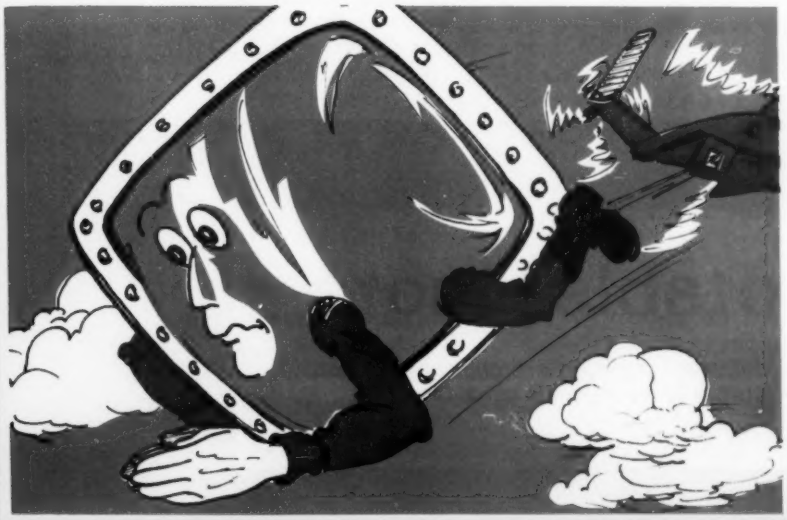
Touchdown was 2,800 feet down the 7,500-foot runway. Even though they used maximum braking and reverse, they couldn't stop the aircraft on the runway and ended up 620 feet beyond the end. Luckily, damage was slight to the commercial jumbo. The captain summed it all up by saying. "If I had stabilized the approach (first) and either maintained a stabilized approach or gone around, we wouldn't have damaged the aircraft."

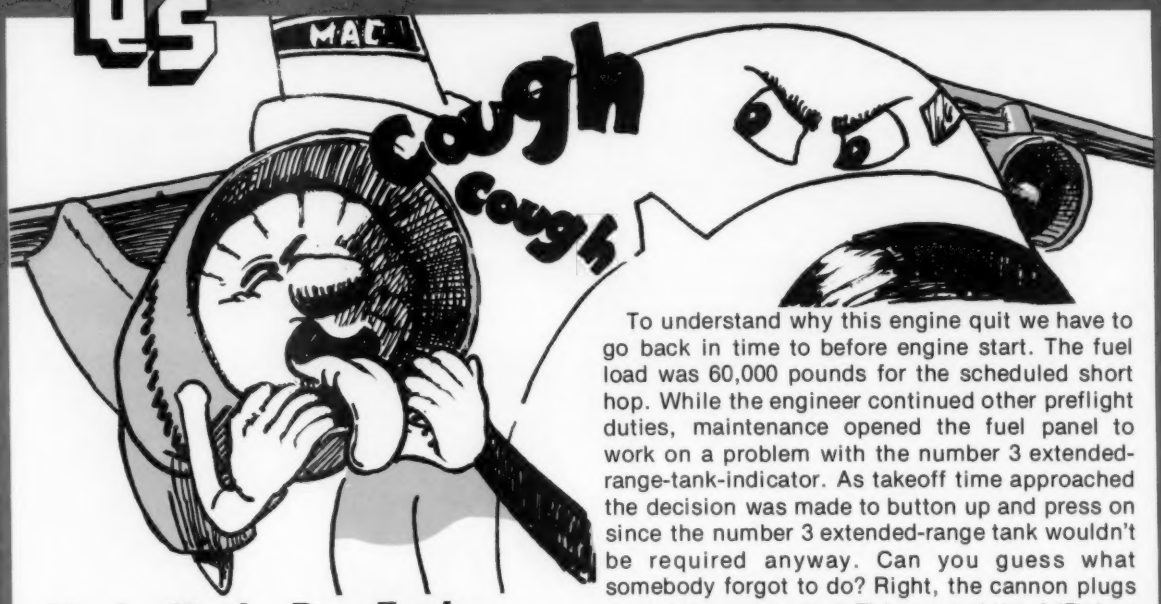
—Pan American *Crosscheck.*



Wandering Window

A "Super Jolly" was simulating combat SAR in an established exercise area in Europe. During one of the escape and evasion maneuvers, the HH-53C ramp-door uplocks disengaged, unlocking the door. As the door swung open, the minigun mount contacted the door's plexiglass window and the window promptly executed a diving descent to the ground. Fortunately the window landed in a sparsely populated area. It seems during any high - G manuevers,the cargo ramp-door uplocks are not designed to hold the door in the "up" position. Until the uplocks are changed, it might be prudent to keep a wary eye the next time you "fling-wingers" are flying down in the dirt.





Hush, Hush, Dry Engine.

The Galaxy crew took off only to be greeted by unusual "rumblings" from the nether regions of the plane. Seconds later, EPR and fuel flow on number 3 engine began to fluctuate. The crew put these two indications together and summarily shut down the suspect engine. Lo and behold, the rumblings didn't go away. About this time, the flight engineer placed the A/R door switch in the "close" position and the rumblings ceased. Now the crew began to suspect they might have shut down an okay engine. A restart was made but the power wouldn't advance beyond idle, and the engine began to cough and sputter again. This time it was shut down for good.

To understand why this engine quit we have to go back in time to before engine start. The fuel load was 60,000 pounds for the scheduled short hop. While the engineer continued other preflight duties, maintenance opened the fuel panel to work on a problem with the number 3 extended-range-tank-indicator. As takeoff time approached the decision was made to button up and press on since the number 3 extended-range tank wouldn't be required anyway. Can you guess what somebody forgot to do? Right, the cannon plugs were not reconnected. This caused the A/R door indicator light to indicate closed even though the door itself was open, and the fuel transfer valves to remain open. With the outboard number 3 main-tank-boost-pump on, the remaining fuel was transferred from the main tank into the other tanks on the right wing, while its fuel quantity indicator remained at its last position (approximately 8,000 pounds). When the tank started running dry, the engine's EPR and fuel flow fluctuated, leading the crew to shut it down. The next time somebody works on your fuel panel or any critical system after you've preflighted it, it might not be a bad idea to make sure everything still works after things are "buttoned up."

—Adapted from 436th MAW *Flying Safety Highlights*

Notable Quote

The difference between a flight accident and incident is one more of degree rather than kind.

AFTER DEADLINES

FOR THE SECOND TIME IN 3 MONTHS, a C-5 has come very close to augering in due to a stall on approach. This second incident occurred on 31 January while the crew was in a holding pattern attempting to correct a gear malfunction. While attending to other details, the airspeed was allowed to decrease to some 40 knots indicated below computed approach speed plus 30 knots. Luckily, the AC who had not been flying the Galaxy, caught the decreasing airspeed in time to add power to all four engines. A disconnected autopilot allowed the nose of the C-5 to come up and shaker onset persisted for "1 or 2 seconds." The giant airlifter did not stall, however. Still, it was close enough to send shivers up the spine of even C.R. Terror, who just happens to experience a similar near-calamity in this month's TMF (see page 25). The moral here is always to fly the airplane no matter what other problems attempt to dominate your attention. Failure to do the former may very well negate the need to do anything about the latter.

C-130 TRAINING VIDEOTAPES AVAILABLE. Little Rock's 34 TATG, in cooperation with the Aerospace Audiovisual Service (AAVS), has produced several videotape programs related to C-130 training. Available now through your base audiovisual service center, are videotapes on Three-Engine Takeoffs (53170) and Windmill Taxi Starts (51658). Also under production is a two-part program about aircraft stalls and aircrew awareness of stall parameters and procedures. This program will be distributed command-wide and to other interested DOD agencies by AAVS. More productions are planned for the near future.

A VISA ISN'T JUST A CREDIT CARD as several active duty military personnel and dependents found out recently. Soon after a C-141B touched down in a foreign land in the South Pacific, customs officials detained four of the passengers who were flying "space-A." Two of these unlucky persons had no entry visas; one didn't have the proper leave authorization with him; and the last one didn't have his passport. Just as bad if not worse, the crew rest of the Starlifter crew was curtailed in order to fly the deported passengers out of the country. All MAC personnel, flyers and non-flyers alike, should check the USAF Foreign Clearance Guide to ensure both you and your pax have the correct credentials before transiting foreign areas. Active duty types should always have several copies of orders plus your military ID card when travelling either in leave or TDY status. If you're moving around "the system" on a space-available basis, make sure you are authorized to transit all the countries on your planned route. Finally, ensure your immunization certificate and passport are appropriately marked for your trip. (MNS 820116-M).

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